**Radiations hardness of nanocrystalline nickel under 450 keV protons**

M. Salhi•1,2,3,4, D.Kpeglo3-4, M. Maaza3-4

*1Unite de Recherche MPE, Faculte des Sciences de l’Ingenieur, Universite Mhamed Bougarra de*

*Boumerdes, Algeria*  
2Centre de Recherche Nucléaire de Birine, CRNB- B.P.180, Ain-Oussera (W) Djelfa-Algérie

3 UNESCO-UNISA Africa Chair in Nanosciences-Nanotechnology, College of Graduate  
Studies, Muckleneuk ridge, PO Box 392, Pretoria, South Africa  
4 Nanosciences African Network (NANOAFNET), iThemba LABS-National Research  
Foundation, 1 Old Faure Road, Somerset West, Western Cape 7129, PO Box 722, South Africa

•Adama Fall: [fallmokhtada@gmail.com](mailto:fallmokhtada@gmail.com)

**Abstract**  
This contribution reports on the effects of 450 keV proton irradiation within the 1015–  
1017H+/cm2 fluence range on nano-crystalline Ni thin films. The surface and in-volume  
induced damages were investigated by grazing incidence X-rays diffraction, atomic force  
microscopy, Rutherford backscattering as well as four-point probe resistivity measurements.  
Within such a type of H+ irradiation, a significant surface roughening and amorphization of  
the external parts of the Ni crystallites for the lowest fluence (1015 H+/cm2 and a recrystallization for higher fluences (1016–1017 H+/cm2) was observed.

**Keywords**: Radiations hardness, Proton irradiation, Nanostructured Ni thin Films, Defects,

Neutron optics

**2021 International conference of the African Physical Society,  
15-19 November 2021, Kigali-Rwanda**